

REMARKS

Applicants file herewith a Petition to Revive for the unintentional abandonment of the instant application.

Applicants also file herewith a change of address.

Claim 1 has been amended to include the limitation that the hydrogen portion of the treat gas in the second stage is less than or equal to 1.5 times the chemical hydrogen consumption in the second reaction stage.

Support for the amendment to Claim 1 can be found on page 11, line 3, of the instant specification.

REJECTION UNDER 35 U.S.C. 102(b)/35 U.S.C. 103(a)

Claims 1-7, 9-15, and 18-26 have been rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as being obvious over United States Patent Number 5,292,428, Harrison et al. (Harrison).

EXAMINER'S POSITION

The Examiner takes the position that Harrison teaches a process wherein a hydrocarbon feedstock is passed through two or more hydrodesulfurization zones connected in a series. Each of these two or more hydrodesulfurization zones contains a packed bed of solid catalyst wherein the liquid is passed from a first zone to the next until hydrodesulfurization zone other than the first zone. Hydrogen-containing gas is recovered from a subsequent hydrodesulfurization zone; target sulfur levels, etc. The Examiner believes that Harrison et al. teaches a process and composition that reasonably appears to

be either the same or an obvious variation of the instantly claimed product and composition.

APPLICANTS' POSITION

As amended, Claim 1 requires that the rate of introduction of the hydrogen portion of the treat gas in the second reaction stage, the aromatics hydrogenation stage, is less than or equal to 1.5 times the chemical hydrogen consumption in the second reaction stage.

Harrison states at col. 10, lines 11-15 that make-up hydrogen molar ratios suitable for use in accordance with Harrison are about 2:1 to about 20:1, preferably about 3:1 to about 7:1. Harrison does not claim or disclose make-up hydrogen molar ratios or equal to 1.5 times the chemical hydrogen consumption in the second reaction stage

It would also not have been obvious to one having ordinary skill in the art and knowledge of Harrison to use hydrogen ratios as low as 1.5 times the chemical hydrogen consumption in the second reaction stage as, again, these ratios are neither suggested nor claimed in Harrison.

The Examiner is requested to reconsider and withdraw this rejection.

REJECTION UNDER 35 U.S.C. 103(a)

Claims 16 and 17 have been rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Number 5,292,428, Harrison et al. (Harrison) in view of United States Patent Number 5,114,562, Haun et al. (Haun).

EXAMINER'S POSITION

Harrison is relied on by the Examiner as above but differs from the instant claims in not teaching a countercurrent aromatics hydrogenation stage or stripping of the liquid stage prior to the aromatics stage.

Haun is cited as teaching countercurrent aromatics hydrogenation and stripping of the liquid stage prior to the aromatics stage. The Examiner further states that Haun teaches a mineral oil conversion process that includes hydrodesulfurization and hydrogenation steps performed in separate reaction zones whereas the instantly claimed invention relates to the hydrogenation of distillate petroleum fractions to produce low sulfur content products. Desulfurization conditions employed are those customarily employed in the art for desulfurization of equivalent feedstocks and the effluent stream of the desulfurization zone is stripped with a stream of hydrogen-rich gas prior to being fed to the hydrogenation zone. The Examiner also mentions that the vapor phase stream from the hydrogenation step in Haun is highly rich in hydrogen and relatively low in hydrogen sulfide and is "cascaded" to the hydrodesulfurization zone and that hydrogen-rich gas may flow countercurrent to the liquid-phase hydrocarbons through one or more reaction zones.

APPLICANTS' POSITION

Claims 16 and 17 are dependent claims, and therefore, include all of the limitations of the claims from which they depend. Therefore, Claims 16 and 17 include all of the limitations of independent Claim 1. More importantly, Claims 16 and 17 include the limitation that the rate of introduction of the hydrogen portion of the treat gas in the

second reaction stage, the aromatics hydrogenation stage, is less than or equal to 1.5 times the chemical hydrogen consumption in the second reaction stage.

As discussed above, these hydrogen ratios are neither suggested nor claimed in Harrison. The limitation that the rate of introduction of the hydrogen portion of the treat gas in the second reaction stage, the aromatics hydrogenation stage, is less than or equal to 1.5 times the chemical hydrogen consumption in the second reaction stage is also neither suggested or claimed in Haun. Therefore it would not have been obvious to one having ordinary skill in the art and knowledge of Haun and Harrison to have modified either invention to include this limitation.

Therefore, the Examiner is requested to reconsider and withdraw this rejection.

Based on the preceding arguments, amendments, and filing of the attached Petition to Revive accompanied by the required fees, the Examiner is requested to reconsider and withdraw the above rejections and pass this application to allowance. The Examiner is encouraged to contact applicant's attorney should the Examiner wish to discuss this application further.

Respectfully submitted:

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**MARKED-UP CLAIMS ACCOMPANYING RESPONSE TO FINAL OFFICE ACTION FOR USSN
09/553,374**

1. (twice amended) A multi stage process for hydrodesulfurizing and hydrogenating a distillate feedstock having a sulfur content greater than about 3,000 wppm, which process comprises:

- a) reacting said feedstream in a first hydrodesulfurization stage in the presence of a hydrogen-containing treat gas, said first hydrotreating stage containing one or more reaction zones, each reaction zone operated at hydrodesulfurizing conditions and in the presence of a hydrodesulfurization catalyst, thereby resulting in a liquid product stream having a sulfur content less than about 3,000 wppm;
- b) passing the liquid product stream to a first separation zone wherein a vapor phase product stream and a liquid phase product stream are produced;
- c) passing the liquid phase product stream to a second hydrodesulfurization stage;
- d) reacting said liquid phase product stream in said second hydrodesulfurization stage in the presence of a hydrogen-containing treat gas cascaded from, or partially cascaded from, the next downstream stage herein, wherein the rate of introduction of the hydrogen portion of the treat gas in this second stage is less than [3]1.5 times the chemical hydrogen consumption in this second reaction stage, said second hydrodesulfurization stage containing one or more reaction zones operated at hydrodesulfurization conditions wherein each reaction zone contains a bed of hydrotreating catalyst, thereby resulting in a liquid product stream having less than about 100 wppm sulfur;
- e) passing the liquid product stream from said second hydrodesulfurization stage to a second separation zone wherein a vapor phase stream and a liquid phase stream are produced;
- f) collecting said vapor phase stream;
- g) passing said liquid phase stream from step e) to an aromatics hydrogenation stage; and
- h) reacting said liquid phase stream in said aromatics hydrogenation stage in the presence of a hydrogen-containing treat gas, said hydrogenation stage containing

one or more reaction zones operated at aromatics hydrogenation conditions wherein each reaction zone contains a bed of aromatics hydrogenation catalyst, thereby resulting in a liquid product stream having substantially reduced levels of sulfur and aromatics, and a hydrogen-containing product stream that is cascaded to an upstream hydrodesulfurization stage.